Mop with wringing operation

CROSS REFERENCE TO RELATED APPLICATION

This application claims the benefit of U.S. Provisional Application Serial No. filed October 25, 2001.

FIELD OF THE INVENTION

The invention relates generally to mops for cleaning floors, and more particularly to a mop that can be wrung by rotating a sleeve slidably disposed on the handle of the mop.

DESCRIPTION OF THE PRIOR ART

Many devices have addressed the shortcomings often associated with the operation of a wringing mop. U.S. Patent # 6,212,728 describes a self-wringing ratchet mop with a tubular member having at least one pawl. When the pawl engages one of the longitudinal channels built in the elongated handle, the tubular member is rotatable in only one direction, thereby preventing slippage or unintended rotation of the mop strands during a wringing operation. The pawl is disengaged from the longitudinal channel by moving the tubular member along the axis of the handle, thus freeing the mop strands from wringing.

U.S. Patent # 5,675,858 describes a string mop with a wringer which is slid from a first position to a second position over a wet mop head of a mop to extract water. Mop strands are wrung by forcing a collar over a pleated sleeve which compresses the enclosed mop head.

Many of the prior art wringing mops are very complicated in design, usually involving many structural components. Some of the wringing mop systems have obvious advantages; however, they are expensive to manufacture.

It is the object of the present invention to provide a wringing mop which is simpler to manufacture and operate than the prior art wringing mops.

SUMMARY OF THE INVENTION

A hollow sleeve, slidably disposed on the handle of the mop, comprises at least one pair of longitudinal walls protruding from the interior surface of the sleeve. As the sleeve is slid over a wet mop head of the mop, the terminal ends of mop strands are retainably held captive in the passageway formed by the walls. The mop strands are wrung dry by rotating the sleeve with respect to the handle of the mop.

In another embodiment of the invention, a tubular member is disposed coaxially and rotatable about a sleeve. Mop strands caught in the passageway defined by a first pair of walls in the tubular member near the terminal ends of the mop strands are twisted with respect to the upper portion of the mop strands held captive by a second pair of walls in the sleeve near the distal end of the mop handle, resulting in a wringing action of the mop head. In another embodiment of the invention, the mop comprises a scrubber depending from a distal end of the sleeve mounted co-axially on the handle of the mop.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a simplified diagram of a first preferred embodiment of the invention, illustrating a mop with a sleeve.

Figure 2 is a simplified diagram showing a plurality of mop strands in a sleeve.

Figure 3 is a simplified diagram of a portion of the first preferred embodiment showing mop strands being bent at the edge of a longitudinal wall mounted on the interior wall surface of a sleeve (partially shown).

Figure 4 is a simplified diagram showing an edge of the wall having an irregular shape for the entrapment of the mop strands.

Figure 5 is a simplified diagram showing some of the mop strands having a plurality of knots tied at the terminal ends thereof.

Figure 6 is a simplified diagram of a second preferred embodiment of the invention showing a mop having two cooperating members, a sleeve and a tubular element, both retainably disposed coaxially on the handle of the mop.

Figure 7 is a side view of the sleeve member.

Figure 8 is a end view of the sleeve member.

Figure 9 is a simplified diagram showing a sleeve having a circular groove adapted for use with a rotatable tubular element.

Figure 10 is s a simplified diagram showing a wringing member having a body with several elongated openings.

Figure 11 is a simplified diagram of a third preferred embodiment of the invention showing a mop having a scrubber for cleaning the floor surface.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the first preferred embodiment of the invention shown in Figure 1, wherein a mop **10**, having a longitudinal elongated handle **20** and a mop element **30**, comprises a wringing member **40**. Mop element **30** comprises a plurality of absorbent material strands **50** depending from a distal end **55** of the mop handle **20**. Mop strands **50** are preferably made of a suitably absorbent material such as cotton, yarn, sponge or the like. Wringing member **40**, comprising an open-ended hollow sleeve **60** at one end and a radially extending, annular shoulder member **70** contiguous with a flexible externally threaded neck **72** at the other end, is slidably and rotatably disposed coaxially on the handle **20** and over the absorbent mop strands **50**. Sleeve **60** generally comprises a hand grip section **74** and a generally frustoconically shaped section **76**. Sleeve **60** includes at least a pair of preferably thin planar walls **80**, protruding radially from and extending along the interior wall surface **90** of the sleeve **60**. Each member in a pair of the thin walls **80** is preferably arranged to be close to each other to form a narrow passageway **100** through which some of the mop strands **50** can slidably pass. Thin walls **80** are relatively short lengthwise compared to those of the stretched mop strands **50**, and are aligned substantially parallel to the longitudinal axis of the mop handle **20**.

Locking collar **110**, comprising an internally threaded tapered bore **112**, is detachably and rotatably disposed co-axially on the mop handle **20**. Threaded tapered bore **112** with its inner diameter decreasing with the depth of the threaded bore **112**, is threadingly engaged with the flexible threaded neck **72** of the wringing member **40**. The wringing member **40** includes a plurality of longitudinal slits **116** at the rim **118** of the threaded neck **72**. Sleeve **60** is slid along the handle **20** until the mop strands **50** are exposed for floor cleaning. Locking collar **110** is slid

along the handle **20** to threadingly engage the threaded neck **72** of the wringing member **40**. Locking collar **110** is rotated until the rim **118** of the threaded neck **72** is pressing against the exterior surface **120** of the handle **20**. The locking collar **110** is tightened to produce enough frictional force in preventing slippage of the sleeve **60** along the handle **20**, thus detachably fixing the sleeve **60** on the handle **20**. The thickness of the rim **118** of the threaded neck **72**, the material used and the size of the slits **116** are properly selected so that the threaded neck **72** of the wringing member **40** is flexible and deformable to be pressed against the handle **20** by the locking collar **110**.

Mop **10** includes a hook-engaging eyelet **122** at the proximal end of the handle **20** for the upright storage of the mop **10** when not in use.

Referring now to Figure 2, locking collar **110** is threadingly disengaged and released from the neck **72** of the wringing member **40**, the sleeve **60** is free to slide along the handle **20** and over to cover the wet mop strands **50**. Thin walls **80** in the sleeve **60** engage the terminal ends **130** of absorbent mop strands **50**. End portion of some of the mop strands **50** is frictionally held captive and retainable in the passageway **100** formed by the walls **80** in the sleeve **60**. Intermediate portion of the mop strands **50** stretched between the thin walls **80** and the distal end **55** of the mop handle **20** is twisted and compressed inwardly, when the sleeve **60** is rotated with respect to the longitudinal axis of the mop handle **20** in a first, clockwise direction as shown by a curved arrow **140**. Moisture and liquid are squeezed from the absorbent mop strands **50** and are allowed to flow downwardly and out from the enclosing sleeve **60** through a one of a plurality of through openings **150** on the sleeve **60**. Mop strands **50** twisted by the rotating sleeve **60** are thereby wrung from the moisture and liquid which have been absorbed during use of the mop **10**.

During a relative rotation of the sleeve **60** and the mop handle **20**, walls **80** are used to function as an obstructing means to block or retard the linear movement of the mop strands **50**, when the terminal ends **130** of the mop strands **50** are being confined and held captive in the passageway **100** formed by the walls **80**, thereby preventing slippage of the mop strands **50** in the sleeve **60**.

Mop strands **50** is returned to its original, unwound condition by rotating the sleeve **60** in a second, anti-clockwise direction shown by a curved arrow **160**, with respect to the longitudinal axis of the handle **20** of mop **10**. Sleeve **60** is slid along the handle **20** until the mop strands **50** are again exposed for cleaning. Locking collar **110** is rotated to tighten the sleeve **60** to the mop handle **20**. Mop strands **50** can be changed and replaced by releasing the locking collar **110** from the handle **20** and by tapping the handle **20** gently towards the ground surface until the sleeve **60** disengages completely from the absorbent mop strands **50**, while holding the sleeve **60** in the upright position.

There are mops of different sizes. The total number of absorbent strands **50** in a mop element **30** can vary from one to another. A slightly different approach is employed in an event that the total number of mop strands **50** in a mop element **30** is very much less than the desirable optimal number, which is the number of mop strands that would fill up the space around the rim **200** of the sleeve **60** slidably disposed on the mop handle **20**.

Referring now to Figure 3, mop strands **50** caught in the passageway **100** formed by a pair of thin walls **80** in the sleeve **60** of Figure 2 are bent when the sleeve **60** is rotated with respect to the longitudinal axis of the handle **20** of mop **10** of Figure 2. A first edge **210** of the wall in contact with the bent mop strands **50** is preferably coarse to retard the linear movement of the bent mop strands **50**. The selected first edge **210** of the thin walls **80**, when in contact

with the bent mop strands **50** and together with the frictional force produced by the individual mop strand **50** against each other, impedes and resists further linear movement of the mop strands **50** caught in the narrow passageway **100** defined by the pair of thin walls **80** in Figure 3.

Referring now to Figure 4, an edge **220** of at least a one of the thin walls **80** having an irregular shape **222**, is engaged with the mop strands **50** to resist linear movement of the mop strands **50** when the sleeve **60** is rotated with respect to the mop handle **20** of Figure 2. The irregular shape **222** of the thin walls **80** at the edge **220** increases the area of contact for the entrapment of the mop strands **50** to retard the linear movement of the mop strands **50** when the mop strands **50** are bent around the edge **220** of the thin walls **80** inside the sleeve **60** of Figure 2.

Referring now to Figure 5, a few of the absorbent mop strands **50** near the outer fringe area **310** of the mop element **30** are selected to have knots **320** tied at the terminal end **130** of each of these selected mop strands **50**. These mop strands **50** that have knots **320** tied at their terminal ends **130** are held captive and retainable in a small narrow passageway **100** defined by the walls **80** in the sleeve **60**. Some of these mop strands **50** are held captive against slippage when the knots **320** of these mop strands **50** are stopped at a second edge **370** located outwardly towards the rim **200** of the sleeve **60**. During a relative rotation of the sleeve **60** and the handle **20** of Figure 2, these absorbent mop strands **50**, having the knots **320** tied at their terminal ends **130**, are wrapped around other inner layers of the mop strands **50**, squeezing and forcing liquid and moisture out from the mop strands **50** of the mop **10** of Figure 2. Mop strands **50** are thereby wrung dry by the rotating sleeve **60** with respect to the mop handle **20** of Figure 2.

Referring now to the second preferred embodiment of the invention shown in Figure 6, wherein a mop **10**, having a longitudinal elongated handle **20** and a mop element **30**, comprises an operating member **340**. Mop element **30** comprises a plurality of absorbent material strands **50** depending from a distal end **55** of the mop handle **20**. Operating member **340**, comprising two cooperating members, a sleeve **60** and a hollow tubular member **400**, is slidably and rotatably disposed coaxially on the handle **20** and over the absorbent mop strands **50**. Sleeve **60**, having an open end **405** at one end and a radially extending, annular shoulder body **70** at the other end, includes at least a first pair of preferably thin planar walls **80**, protruding radially from the interior wall surface **90** of the sleeve **60**. Each member in a pair of the thin walls **80** is preferably arranged to be close to each other to form a narrow passageway **100** through which some of the mop strands **50** can slidably pass. Thin walls **80** are aligned substantially parallel to the longitudinal axis of the mop handle **20**.

Referring now to Figure 6, 7, and 8, sleeve **60** includes a pair of split-rings **410** inserted into a cut-away circular section **420** at the bottom portion **430** of the sleeve **60**. Split-rings **410** are fixedly mounted inside the sleeve **60** using glue, threaded bolts or the like. Split-rings **410** are positioned with their terminal ends **440** facing each other to form two longitudinal channels **450**. An inner circular track **460** is formed directly behind the split-rings **410** inside the sleeve **60**.

Tubular member **400**, having at least a second pair of walls **480** protruding from the interior wall surface **490** of the tubular member **400**, comprises two pole members **500** protruding outwardly in a radial direction from the exterior surface **510** of the tubular member **400**. Pole members **500** are adapted for insertion into the longitudinal channels **450** and are rotatably retainable in the inner circular track **460** of the sleeve **60**. The pole members **500** are inserted

through the longitudinal channels **450** into the inner circular track **460** of the sleeve **60**. Tubular member **400** is coupled rotatably to the sleeve **60** when the pole members **500** of the tubular member **400** are sliding along the inner circular track **460** of the sleeve **60**. Walls **480** include features which are similar to the walls **80** discussed in the foregoing embodiment of the cleaning mop **10** in Figure 2, 3 and 4.

Indicia **540** are marked on the sleeve **60** and on the tubular member **400** to indicate where the sleeve **60** and the tubular member **400** may be disengaged for dis-assembly. Indicia **550** are marked on the sleeve **60** and on the tubular member **400** to indicate where the pole members **500** are positioned along the circular track **460** other than being directly behind the longitudinal channels **450**, when the mop **10** is ready for use in a moping or a wringing operation.

Locking collar **110**, discussed in the first embodiment of the mop **10** in Figure 1, is retainably disposed on the handle **20**. Sleeve **60** is disengaged and released from the locking collar **110** by untightening the locking collar **110** when the indicia **550** on the sleeve **60** and on the tubular member **400** are aligned with each other. Tubular member **400**, after having been coupled together with the sleeve **60**, is slid along the handle **20** and over the absorbent mop strands **50**. The first pair of walls **80** in the sleeve **60** engages the upper portion **560** of the mop strands **50** near the distal end **55** of the mop handle **20**, the second pair of walls **480** in the tubular member **400** engages the terminal ends **130** of the mop strands **50**. In a wringing operation, the terminal ends **130** and the upper portion **560** of the mop strands **50** are held captive in their respective passageways **100** and the passageways **580** defined respectively by the walls **80** and walls **480**, during a relative rotation of the tubular member **400** and the sleeve **60**. The intermediate portion of the mop strands **50** stretched between

the first pair of the walls **80** and the second pair of the walls **480** is twisted by the relative rotation of the tubular member **400** and the sleeve **60**, thereby wringing from the mop strands **50** the moisture and liquid absorbed during a moping operation. Moisture and liquid squeezed from the absorbent mop strands **50** are allowed to flow downwardly and out from the enclosing sleeve **60** through one of the plurality of through openings **150** on the sleeve **60**.

Referring now to Figure 9, wherein another simple way of engagement for a sleeve **60** with a tubular member **400** is illustrated. Sleeve **60** includes a circular groove **600** embedded in the sleeve **60**. A flexible ridge or a deformable annular tapered ring **620**, with a thickness that is decreasing towards the rim **630** of the tubular member **400**, is mounted on the exterior surface **640** of the tubular member **400**. Tubular member **400** is forcibly inserted into the inner passageway **650** of the sleeve **60**, with the annular ring **620** entering into the circular groove **600** of the sleeve **60**. Tubular member **400** is co-axially coupled to and rotatable about the sleeve **60**, with the annular ring **620** rotating in the circular groove **600** of the sleeve **60**. Annular ring **620** is fixedly mounted on the exterior surface **640** of the tubular member **400** using adhesive or the like.

Though the sleeve **60** is used to illustrate the wringing operation of the mop element **30** in the foregoing embodiments, it is obvious that the body of the sleeve **60** may have a variety of shapes. Referring now to Figure 10, a wringer or a wringing member **660**, having a hollow body with a plurality of elongated openings **670** for a better visibility in a rotating operation, comprises a plurality of walls **80** protruding from the interior wall surface **90** of the wringing member **660**. Walls **80** in the wringing member **660** are used to function as an obstructing means to block or retard the linear movement of the mop strands **50** of Figure 2, when the terminal ends **130** of the mop strands **50** of Figure 2 are being

confined and held captive in the passageway **100** formed by the walls **80**, thereby preventing slippage of the mop strands **50** in the passageway **100** of the wringing member **660** upon a relative rotation of the wringing member **660** and the mop handle **20** of Figure 2.

Referring now to the third preferred embodiment of the invention shown in Figure 11, wherein a scrubber element **710**, having an externally threaded body **720** mounting an abrasive member **730**, is mounted on the distal end **740** of a sleeve **60**. Sleeve **60** is discussed in detail in the foregoing embodiment of the mop **10** in Figure 1. An abrasive member **730** can be an abrasive pad, brush or similar coarse material. Portion of the interior wall surface **90** of the sleeve **60** is internally threaded and the scrubber element **710** is retainably disposed on the distal end **740** of the sleeve **60**.

Having described the invention and its preferred modes of operation in sufficient detail for those of normal skill in the art to practice the same, it will be obvious to such practitioners to make certain changes and variation in the specific elements of the disclosed embodiments without departing from the scope of the invention. For example, a plurality of longitudinal walls **80** protruding from the interior wall surface of the sleeve **60** can be employed in Figure 2. Walls **80** are mounted in spaced apart relationship with each other in the sleeve **60** to resist linear movement of the mop strands **50**, when the mop strands **50** are bent and twisted during a relative rotation of the sleeve **60** and the mop handle **20**. A suitably dimensioned longitudinal wall **80** having a coarse surface on its face may be deployed in the sleeve **60**, the wringing result may vary, depending on the size and the number of the mop strands **50** in the mop **10**. It is also possible that rather than having a plurality of knots **320** tied at the terminal ends **130** of the mop strands **50**, the thickness at the terminal ends **130** of the mop strands

50 may be increased by using thicker cotton or by attaching fabric or other obstructing material, etc to retard linear movement and prevent slippage of the mop strands through the passageway **100** formed by the walls **80**. Though the thin planar walls **60** are used in the foregoing embodiments, wall in an arcuate shape or in a corrugated form can also be employed. A plurality of ball bearings may be used to substitute the annular ring **620** for a relatively smooth rotation of the tubular member **400** with respect to the sleeve **60** in Figure 9.

It is clear that the foregoing disclosure is merely illustrative of the principles of the present invention. Various modifications and additions, apparent to those skilled in the art, may be made without departing from the spirit and broader aspects of this invention as defined in the appended claims.